CLAIMS

1. A method of irradiating at least one surface of a three-dimensional object with a desired ultraviolet light flux produced by an ultraviolet light source comprising:

determining a position at which the three-dimensional object will be positioned relative to the ultraviolet light source when the at least one surface is to be irradiated with the desired ultraviolet light flux;

determining an unmodified ultraviolet light flux which would irradiate the at least one surface when the ultraviolet light source is activated while the three-dimensional object is at the position relative to the ultraviolet light source;

producing an optical element, based upon the unmodified ultraviolet light flux and the desired ultraviolet light flux, which provides a modified wavefront of the ultraviolet light flux produced by the ultraviolet light source and which optical element, if positioned in a path of the wavefront of the ultraviolet flux to the at least one surface, would cause the modified wavefront to irradiate the at least one surface with the desired ultraviolet light flux;

positioning the optical element in the path which the wavefront of the ultraviolet light from the ultraviolet light source would follow in irradiating the at least one surface; and

activating the ultraviolet light source to transmit the ultraviolet light flux from the ultraviolet light source to the optical element to cause irradiation of the at least one surface with the desired ultraviolet light flux.

2. A method in accordance with claim 1 wherein:

the desired light flux produces a substantially uniform irradiance on the at least one surface.

3. A method in accordance with claim 2 wherein:

the irradiation of the at least one surface cures a surface coating thereon.

4. A method in accordance with claim 1 wherein:

the irradiation of the at least one surface oxidizes the at least one surface.

5. A method in accordance with claim 1 wherein:

the irradiation of the at least one surface oxidizes at least one layer coated on the at least one surface.

6. A method in accordance with claim 1 wherein:

the irradiation of the at least one surface disinfects the at least one surface.

7. A method in accordance with claim 1 wherein:

the irradiation of the at least one surface decontaminates the at least one surface.

8. A method in accordance with claim 1 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

9. A method in accordance with claim 2 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

10. A method in accordance with claim 3 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

11. A method in accordance with claim 4 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

12. A method in accordance with claim 5 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

13. A method in accordance with claim 6 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

14. A method in accordance with claim 7 wherein:

the ultraviolet light source is a plasma discharge lamp providing UV radiation in a desired wavelength range.

15. A method in accordance with claim 1 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

16. A method in accordance with claim 2 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

17. A method in accordance with claim 3 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

18. A method in accordance with claim 4 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

19. A method in accordance with claim 5 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

20. A method in accordance with claim 6 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

21. A method in accordance with claim 7 wherein:

the ultraviolet light source is a non-coherent solid-state ultraviolet diode array providing the desired ultraviolet light flux.

22. A method in accordance with claim 1 wherein:

the optical element is a lens that reconfigures the ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

23. A method in accordance with claim 2 wherein:

the optical element is a lens that reconfigures the transmitted ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

24. A method in accordance with claim 3 wherein:

the optical element is a lens that reconfigures the transmitted energy distribution ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

25. A method in accordance with claim 4 wherein:

the optical element is a lens that reconfigures the transmitted energy distribution ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

26. A method in accordance with claim 5 wherein:

the optical element is a lens that reconfigures the transmitted energy distribution ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

27. A method in accordance with claim 6 wherein:

the optical element is a lens that reconfigures the transmitted energy distribution ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

28. A method in accordance with claim 7 wherein:

the optical element is a lens that reconfigures the transmitted energy distribution ultraviolet light flux transmitted from the ultraviolet light source to the at least one surface.

29. A method in accordance with claim 1 wherein:

the optical element comprises overlapping layers of a variable index of refraction lens material with at least two layers having a different index of refraction.

30. A method in accordance with claim 1 wherein:

the optical element comprises overlapping layers of a lens material of different thickness and having a different index of refraction.

31. A method in accordance with claim 1 wherein:

the optical element is a lens which modifies the light flux produced by the ultraviolet light source and a mirror that reconfigures light flux transmitted by the lens to irradiate the at least one surface with the desired ultraviolet light flux.

32. A method in accordance with claim 1 wherein:

the optical properties of a lens and mirror are determined by using a ray tracing methodology.

33. A method in accordance with claim 1 wherein:

the optical element comprises lens material bonded to the at least one mirror.

34. A method in accordance with claim 1 wherein:

the optical element comprises at least one hologram through which the wavefront passes and the at least one ultraviolet light source is non-coherent.

35. A method in accordance with claim 1 wherein:

the at least one optical element is at least two holograms through which the wavefront passes and the at least one non-coherent ultraviolet light source radiates two or more wavelengths.

36. A method of irradiating at least one surface of a three-dimensional object with a desired light flux produced by an light source comprising:

determining a position at which the three-dimensional object will be positioned relative to the light source when the at least one surface is to be irradiated with the desired light flux;

determining an unmodified light flux which would irradiate the at least one surface when the light source is activated while the three-dimensional object is at the position relative to the light source;

producing an optical element, based upon the unmodified light flux and the desired light flux, which provides a modified wavefront of the light flux produced by the light source and which optical element, if positioned in a path of the wavefront of the flux to the at least one surface, would cause the modified wavefront to irradiate the at least one surface with the desired light flux;

positioning the optical element in the path which the wavefront of the light from the light source would follow in irradiating the at least one surface; and

activating the light source to transmit the light flux from the light source to the optical element to cause irradiation of the at least one surface with the desired light flux.

37. A method in accordance with claim 36 wherein:

the desired light flux produces a substantially uniform irradiance on the at least one surface.

38. A method in accordance with claim 36 wherein:

the optical element is a lens that reconfigures the light flux transmitted from the light source to the at least one surface.

39. A method in accordance with claim 36 wherein:

the optical element comprises overlapping layers of a different index of refraction lens material with at least two layers having a different index of refraction.

40. A method in accordance with claim 36 wherein:

the optical element is a lens which modifies the light flux produced by the light source and a mirror that reconfigures light flux transmitted by the lens to irradiate the at least one surface with the desired light flux.

41. A method in accordance with claim 36 wherein:

the optical element comprises at least one hologram through which the wavefront passes and the at least one light source is non-coherent.